IN THE EUROPEAN PATENT OFFICE INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY (IPEA/EP)

Applicant(s): DOW GLOBAL TECHNOLOGIES INC.
(Wenbin Liang et al.)
International Application No.: PCT/US2004/039823
Filed: 29 November 2004
For: FILMS WITH SUPERIOR IMPACT RESISTANCE AND IMPROVED CATASTROPHIC FAILURE RESISTANCE UNDER HIGH STRAIN RATE
REFERENCE: 63385B
Authorized Officer: D. Hutton

RESPONSE TO WRITTEN OPINION

Dear Sir/Madam:

In response to the second Written Opinion by the International Preliminary Examining Authority mailed on January 2, 2006.

Please amend the claims as indicated. Replacement page 9 is attached.

1. A stretch film having three or more layers wherein:

A) at least one layer comprises a polyethylene characterized as having:

i) a density from ~~about~~ 0.9 g/cc to ~~about~~ 0.96 g/cc;

ii) a melt index from ~~about~~ 0.5 g/10 minutes to ~~about~~ 10 g/10 minutes, measured in accordance with ASTM D 1238, condition 190°/2.16 kg; and

iii) a molecular weight distribution from ~~about~~ 2.5 to ~~about~~ 4.5; and

iv) a Composition Distribution index (CDBI) greater than 50%; and

B) wherein at least one non-surface layer comprises at least one propylene polymer; and

C) wherein the stretch film is characterized as having an ultimate stretch of at least 200%, a Dart A of at least 430 gms/mil and a CF of 5% or less.

REMARKS

Claim 1 was amended by adding the CDBI limitation to the at least one polyethylene layer. This amendment is fully supported in the original specification, for example at page 4 line 1, or in original Claim 18. Claim 1 was also amended by

deleting all occurrences of the word "about", as requested by the Examiner. Accordingly no new matter is added, and the entry of these amendments is proper.

In the Second Written Opinion, the Examiner first objected to the "CF" value as lacking clarity. The Examiner stated that the CF value involves the deliberate introduction of a defect into the film during the testing procedure, then states "This degree of stretch is not defined in the application". It is assumed that the Examiner wants a specific elongation recited as to when the defect is introduced, but this is not how the test is conducted. As described beginning on page 3, line 12 of the specification, the defect is introduced at incrementally increasing strain rates until the defect causes a catastrophic failure in the film. Thus, the exact degree of stretch at which the defect causes catastrophic failure is the variable which is measured in this test and not a defined setting.

Next, the Examiner has expressed the opinion that EP-A2-0785 065 (hereinafter D1) is novelty destroying for Claims 1-9. The Examiner stated, "D1 discloses a stretch film with a polypropylene core and LLDPE outer layers." The Examiner acknowledged that the MWD of the LLDPE outer layers was not provided but referred to page 4 lines 25-30 which states that a preferred ethylene copolymer has a "relatively narrow molecular weight distribution broader than polyethylene made with metallocene catalysts and narrower than typical LLDPEs". The applicants respectfully assert that the above quoted passage does not unambiguously teach or suggest a molecular weight distribution from about 2.5 to about 4.5 as recited in the claims.

Nevertheless, in an attempt to even further distinguish the presently claimed subject matter from the disclosure in D1, the Applicants have amended the claims to now additionally require a composition distribution breadth index ("CDBI") of greater than 50%. CDBI is a measurement and characterization of the breadth of short chain branching (the "composition") distribution. As known in the art (and described in the specification at page 4 lines 38-40), CDBI is defined as the weight percent of the polymer molecules having a comonomer content within 50% of the median total molar comonomer content. Thus a polymer having a low CDBI percentage will have a variety of molecules having a wide variety of short chain branching, such as seen in a typical Ziegler-Natta polymerized polyethylene, and including such resins as "Super-

Hexenes". Other newer resins such as those produced using metallocene catalysis have higher CDBI values indicating a narrower short chain branching distribution (i.e., many of the polymer molecules have similar amounts of short chain branching from molecule to molecule). As is known in the art, short chain branching is due to comonomer incorporation, e.g., hexene in the case of the example cited in D1.

D1 does not teach or suggest using polyethylene characterized as having a CDBI greater than 50%. Furthermore, the materials disclosed in D1 would not inherently meet this limitation. D1 specifies a preferred ethylene copolymer of SUPER HEXENE 9022 available from Nova Chemicals. This is reported to be an ethylene hexene linear low density copolymer having a density of 0.917 g/cc and a melt index of 1 g/10 min. Note that Nova Chemicals identifies its super hexene resins as being produced in the gas phase process using advanced Ziegler Natta catalyst (see the attached presentation by J. Bayley from the SPE Polyolefins 2005 conference). Although the CDBI for SUPER HEXENE 9022 is not disclosed, as discussed above, use of Ziegler Natta catalysis tends to result in a polymer with a broad composition distribution, i.e. a polymer having low CDBI percentage.

Applicants have not been able to obtain a sample of SUPER HEXENE 9022 material to confirm its low CDBI, but did obtain a comparable material, "NTE 3", available from the ExxonMobil Chemical company. NTE 3 is an ethylene-hexene linear low density polymer now labeled as NTX and described by ExxonMobil as a "Super hexene enhanced polyethylene" (see enclosed printout of ExxonMobil Chemical's web page). NTE 3 is reported as having a melt index (I_2) of 1.0 g/10 min and a density of 0.9215 g/cc. It should be noted that the NTE 3 resin includes 7920 ppm talc, meaning the resin itself is even closer to the 0.917 g/cc density reported for the SUPER HEXENE 9022. The CDBI for the NTE 3 obtained by the Applicants was determined to be 31% using Analytical Temperature Rising Elution Fractionation ("ATREF"), which is significantly lower than the 50% limit now specified in the claims. This is further evidence that the materials in D1 would not inherently meet the limitations now in the claims.

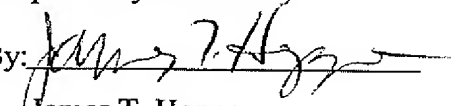
Moreover, it would not have been obvious to substitute material having a CDBI greater than 50% for the SUPER HEXENE 9022 in D1. As seen in Comparative Example 1 of the present specification, film made from Resin A (which

meets the characteristics described in part A of claim 1, including a component having a CDBI of greater than 50%) results in a film having a CF of 9, which is undesirably high. A person of ordinary skill in art would not be motivated to replace the SUPER HEXENE 9022 with a material as described in part A of claim 1, because they would not want to harm the catastrophic failure value. Therefore, it is unexpected that the combination of materials now recited in the present claims delivers the desired combination of ultimate stretch, dart impact, and catastrophic failure.

Next, the Examiner has stated, the present claims must be regarded as speculative because "although the scope of the present claims would embrace any multi-layer film displaying the desired properties, only two examples . . . are taught". Applicants respectfully contest the assertion that the present claims embrace any multi-layer film, particularly in light of the current amendments. As now recited, specific limitations as to the makeup of the layers is provided, in addition to the recitation of the desired properties. It is believed that selection of materials meeting these limitations will lead to the desired results. Similarly, with the recitation of the chemical makeup of the various layers, it can no longer fairly be said that the Applicants are claiming only "desiderata" as asserted by the Examiner.

Given the amendments and remarks, the Applicant's now courteously request a favorable indication of patentability.

Respectfully submitted,

By: 

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WHAT IS CLAIMED IS:

1. A stretch film having three or more layers wherein:

A) at least one layer comprises a polyethylene characterized as having:

i) a density from 0.9 g/cc to 0.96 g/cc;

ii) a melt index from 0.5 g/10 minutes to 10 g/10 minutes, measured in accordance with ASTM D 1238, condition 190°/2.16 kg; and

iii) a molecular weight distribution from 2.5 to 4.5; and

iv) a Composition Distribution index (CDBI) greater than 50%; and

B) wherein at least one non-surface layer comprises at least one propylene polymer; and

C) wherein the stretch film is characterized as having an ultimate stretch of at least 200% , a Dart A of at least 430 gms/mil and a CF of 5% or less.

2. (Cancelled)

3. The stretch film of Claim 1 wherein the film comprises at least 50 % by weight polyethylene.

4. The stretch film of Claim 1 wherein the film is in the range of 0.4 to 3 mil in thickness.

5. The stretch film of Claim 4 wherein the film is in the range of 0.7 mils to 3 mils.

6. The stretch film of Claim 1 having a Dart A greater than 570 gms/mil.

7. The stretch film of Claim 1 having a Dart A greater than 700 gms/mil.

8. The stretch film of Claim 1 having a CF of 3% or less.

9. The stretch film of Claim 1 having an ultimate stretch of at least 300%.

10. (Cancelled)

11. (Cancelled)

12. The stretch film of Claim 1 comprising a homogeneous polymer component.